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IS 1874 (1992): Ready mixed paint, universal zinc chrome, priming (synthetic) for light alloys [CHD 20: Paints, Varnishes and Related Products]

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(पहला पुनरीक्षण)

Indian Standard

READY MIXED PAINT, UNIVERSAL, ZINC CHROME, PRIMING (SYNTHETIC) FOR LIGHT ALLOYS - SPECIFICATION

(First Revision)

UDC 667.633.41 : 661.876.247

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

***September* 1992** **Price Group 4**

Industrial Paints Sectional Committee, CHD 031

FOREWORD

This standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Industrial Paints Sectional Committee had been approved by the Chemical Division Council.

This primer is intended to be a universal primer, specially suitable for priming light alloys used in aircraft and marine industry. The material is suitable for use with all synthetic finishes, with the exception of special ester lubricant oil resistant finishes.

This standard is fully aligned with CQAEM/SS/106 of January 1990 Specification for paint, RFU priming, zinc chrome, universal synthetic (brushing/spraying). issued by the Department of Standardization, Ministry of Defence, Government of India.

In this revision the composition has been revised and salt spray test has been made more stringent to suit even the use of Navy as fire retardant paint.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values *(revised)*'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

AMENDMENT NO. 1 APRIL 2006
TO
IS 1874 : 1992 READY MIXED PAINT, UNIVERSAL, ZINC CHROME, PRIMING (SYNTHETIC) FOR LIGHT ALLOYS — SPECIFICATION

(First Revision)

(*Page* 2, *clause* **4.8**) — Delete the clause and renumber the subsequent clauses accordingly.

(CHD 20)

Reprography Unit, BIS, New Delhi, India

Indian Standard

READY MIXED PAINT, UNIVERSAL, ZINC CHROME, PRIMING (SYNTHETIC) FOR LIGHT ALLOYS – SPECIFICATION

(First Revision)

1 SCOPE

This standard prescribes the requirements and methods of sampling and test for the material commercially known as ready mixed paint, universal, zinc chrome, priming (synthetic) for light alloys. The material is used for the protection of light alloys and in some cases steel work. It may be used both under marine and inland outdoor conditions. The primed surfaces will normally be overcoated with interior fire retardant paints.

2 REFERENCES

The Indian Standards listed in Annex A are the necessary adjuncts to this standard.

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 1303 : 1983 shall apply.

4 REQUIREMENTS

4.1 Composition

The material shall be manufactured with the following ingredients:

a) The mass of pigment of total solids shall not be less than 65 percent;

b) The amount of zinc chrome pigment, conforming to type 2 of IS 51 : 1979 shall not be less than 40 percent, by mass of the total amount of pigment in the paint, when tested as prescribed in Annex B. It shall correspond to a minimum of 17.2 percent of chromic anhydride (CrO_3) and 14.6 percent of zinc oxide (ZnO); and

c) Non-volatile vehicle consisting of a drying oil, modified phenolic or phenolic alkyd resin varnish containing refined linseed oil (*see* IS 75 : 1973); thinners and driers in suitable proportions so as to satisfy the requirements of this specification.

4.1.1 The linseed oil, refined, may be replaced wholly or in part by tung oil (*see* IS 80 : 1991).

4.1.2 The material shall be suitable for use with oleoresinous synthetic and nitrocellulose-based undercoats, surfacers, fillers, putties and etch primer.

4.1.3 The thinner used shall be petroleum hydrocarbon (*see* IS 1745 : 1978).

4.2 Suitability for Spraying

The material shall be suitable for use by spraying when diluted with not more than 10 percent of thinner for synthetic paints and varnishes for aircrafts (*see* IS 1872 : 1961).

4.3 Compatibility with Thinner

The material shall be suitable for thinning with thinners used for synthetic paints and varnishes for aircrafts (*see* IS 1872 : 1961).

4.3.1 White spirit with an aromatic content of not more than 20 percent shall be used when the material is intended for use by the Navy.

4.4 Relative Consistency

The efflux time from a full No. 4 Ford Cup at 27 ± 2°C when determined as prescribed in IS 101 (Part 1/Sec 5): 1989, shall be not less than 80 and not more than 120 seconds.

4.5 Resistance to Salt Spray

When tested as prescribed in **3** of IS 101 (Part 6/Sec 1): 1989 for a continuous period of 96 hours there shall be no damage, blistering or flaking of the paint film or under film corrosion of the metal.

4.6 Resistance to Natural or Artificial Sea Water

When tested as prescribed in Annex C, the panel prepared from the material shall show no damage, blistering or flaking of the paint film, or underfilm corrosion. It shall not be below 8 of the IS 101 (Part 6/Sec 4) : 1991.

4.7 The material shall also conform to the requirements given in Table 1 when tested according to the methods given in col 4 of the table.

4.8 Water Content

If water is suspected to be present in the material, it shall not exceed 0·5 percent when tested as prescribed in IS 101 (Part 2/Sec 1): 1988.

4.9 Fire Retardness

The material, when intended for defence purposes, shall pass the test as prescribed in Annex D.

4.10 Lead Restriction

When lead restricted material is required, in addition to the requirements stipulated in **4.1** to **4.9**, it shall also be tested for lead restriction in accordance with **28** of IS 101 : 1964.

4.10.1 When thus tested, the material shall not contain lead or lead compounds or a mixture of both calculated as lead monoxide (PbO), exceeding 5 percent by weight.

5 SAMPLING

Representative samples of the material shall be drawn as prescribed in IS 101 (Part 1/Sec 1) : 1986.

6 TESTS

6.1 Tests shall be conducted as per the methods referred to in col 4 of Table 1 and in **4.8, 4.9, 4.10.**

6.2 Quality of Reagents

Unless otherwise specified, pure chemicals and distilled water (*see* IS 1070 : 1992) shall be employed in tests.

NOTE - 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the result of analysis.

Table 1 Requirements for Ready Mixed Paint, Universal, Zinc Chrome, Priming (Synthetic) for Light Alloys

(*Clause* 4.7)

Sl No.	Characteristic	Requirement	Methods of Test (Ref to IS 101)
(1)	(2)	(3)	(4)
i)	Drying time		
	a) Surface	Not more than 2 hours	(Part 3/Sec 1) : 1986
	b) Hard dry	Not more than 8 hours	
ii)	Consistency	Smooth and uniform	(Part 1/Sec 5) : 1989
iii)	a) Finish	Smooth and eggshell flat	(Part 3/Sec4) : 1987
	b) Fineness of grind, *Max*	50	—
	c) Gloss value, 45° (Specular)	Not more than 15 units	—
iv)	Colour	As that of zinc chrome	(Part 4/Sec 2) : 1989
v)	Wet opacity, m^2/101, *Min*	80	(Part 4/Sec 1) : 1988
vi)	Mass in kg/101	14.0 ± 0.5	(Part 1/Sec 7) : 1986
vii)	Scratch hardness after 48 hours airdrying	No scratch as to show the bare metal	(Part 5/Sec 1) : 1988
viii)	Flexibility and adhesion after 48 hours airdrying (on magnesium-aluminium panel)	No damage, detachment or cracking of the film	(Part 5/Sec 2) : 1988
ix)	Protection against corrosion under conditions of condensation	No signs of corrosion	(Part 6/Sec 1) : 1988
x)	Flash point	Not below 30°C	(Part 1/Sec 6) : 1987
xi)	Presence of phenol (in dry vehicle)	Positive	IS 354 (Part 2) : 1986
xii)	Accelerated storage stability	To pass the test	Annex E
xiii)	Keeping properties	Not less than 12 months	(Part 6/Sec 2) : 1989

7 PACKING AND MARKING

7.1 The material shall be packed as agreed to between the purchaser and the supplier in sound, clean dry barrels of suitable capacity provided the containers do not have any action on the material, and subject to the provisions of Red Tariff No. 18 of 1960 issued by the Indian Railways Conference Association with any addition or alterations made thereunder.

7.2 The containers shall be securely closed and marked with the following:

a) Name of the material,

b) Mass of the material,

c) Indication of the source of manufacture,

d) Month and year of manufacture, and

e) Lot or batch number.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
51 : 1979	Specification for zinc chrome for paints *(first revision)*
75 : 1973	Linseed oil, raw and refined (*second revision)*
80 : 1991	Tung oil for paints (*second revision*)
101 : 1964	Methods of test for ready mixed paints and enamels (*second revision*)
101 (Part 1/ (Sec 1) : 1986	Methods of sampling and tests for paints, varnishes and related products: Part 1 Tests on liquid paints (general and physical), Section 1 Sampling (*third revision*)
(Sec 5) : 1989	Section 5 Consistency
(Sec 6) : 1987	Section 6 Flash Point (*third revision)*
(Sec 7) : 1987	Section 7 Mass per ten litres (*third revision*)
101 (Part 2/ (Sec 1) : 1988	Part 2 Preliminary examination and preparation of samples for testing/Section 1 Water content (*third revision*)
101 (Part 3/ (Sec 1) : 1986	Part 3 Test on paint film formation, Section 1 Drying time (*third revision)*
(Sec 4) : 1987	Section 4 Finish (*third revision*)
101 (Part 4/ (Sec 1) : 1988	Part 4 Optical tests on paint films, Section 1 Opacity (*third revision)*
(Sec 2) : 1989	Section 2 Colour
101 (Part 5/ (Sec 1): 1988	Part 5 Mechanical tests on paint films, Section 1 Hardness test
(Sec 2) : 1988	Section 2 Flexibility and adhesion
101 (Part 6/ (Sec 1) : 1988	Part 6 Durability tests on paint films, Section 1 Durability under conditions of condensation (*third revision)*
(Sec 2) : 1989	Section 2 Keeping properties
(Sec 4) : 1991	Section 4 Degradation of coatings (Pictorial aid for evaluation)
354 (Part 2) : 1986	Methods of sampling and test for resins for paints : Part 2 Special test methods for alkyd resins (*second revision*)
1070 : 1992	Reagent grade waters – Specification (*third revision*)
1303 : 1983	Glossary of terms relating to paints (*second revision)*
1745 : 1978	Petroleum hydrocarbon solvents (*second revision)*
1872 : 1961	Thinner for synthetic paints and varnishes for aircrafts

ANNEX B

[*Clause* 4.1 (b)]

DETERMINATION OF CHROMIC ANHYDRIDE AND ZINC OXIDE

B-0 OUTLINE OF THE METHOD

B-0.1 Chromic anhydride is determined by titrating the iodine liberated from potassium iodide with standard sodium thiosulphate solution. Zinc oxide is determined in the same solution by titrating the iodine subsequently liberated on addition of potassium ferricyanide, with standard sodium thiosulphate solution.

B-1 REAGENTS

B-1.1 Dilute Sulphuric Acid — approximately 7 N.

B-1.2 Potassium Iodide Solution — freshly prepared, 10 percent.

B-1.3 Standard Sodium Thiosulphate — 0.1 N.

B-1.4 Starch Solution — 0.5 percent.

B-1.5 Potassium Ferricyanide Solution

M/10, prepared in cold water, filtered rapidly and kept in a dark bottle. The solution can be suitably used for seven days if kept in dark when not in use.

B-1.6 Ammonium Bifluoride (NH_4) HF_2 — solid.

B-1.7 Sodium Hydroxide Solution — 10 percent (approximately).

B-2 PROCEDURE

B-2.1 Weigh accurately about 1 g of the pigment in a 250-ml beaker and add about 100 ml of sodium hydroxide solution. Stir well by rubbing with a glass rod and boil slowly for 5 minutes over a wire gauze. Place the beaker, covered with a watch-glass on a water-bath for about half an hour. Filter over filter paper (Whatman No. 42) in a 500-ml conical flask. Wash well with hot water until the residue is free from chromate. Cool the filtrate in ice water and neutralize it with dilute sulphuric acid. Add 30 ml of dilute sulphuric acid after neutralization and cool. Then estimate chromic anhydride and zinc oxide content as given in **B-2.2, B-2.3** and **B-2.4.**

B-2.2 Transfer the solution to a 500-ml iodine flask containing 100 ml of water and 20 ml of dilute sulphuric acid. Add 30 ml of potassium iodide solution and allow to stand for 5 minutes. Titrate the liberated iodine with standard sodium thiosulphate solution after adding 5 ml of starch solution as indicator. Note the volume of sodium thiosulphate solution used in the titration (V_1).

B-2.3 After the titration for chromic anhydride, add ammonia solution dropwise until the litmus test paper first turns blue. (An excess of ammonia solution, more than 3 to 4 drops, should not be added as it is essential that the blue litmus should turn red with ammonium bifluoride to be added subsequently). Cool and add 2 to 3 g of ammonium bifluoride and sufficient water to make volume approximately 250 ml. (Sometime traces of iodine liberated during neutralization can be cleared by one or two drops of sodium thiosulphate solution). Add V1/3 ml of potassium ferricyanide solution. Stir and allow to stand for about 2 minutes. Titrate the liberated iodine with standard thiosulphate solution. After the end point, the colour of the test solution will be bright pale greenish-yellow. Note the volume of sodium thiosulphate solution used in the second titration (V_2). If V_2 is less than 6 ml, the titration is to be repeated with the addition of (V_2+2) ml of potassium ferricyanide solution in place of V1/3 ml.

B-2.4 If V_2 is less than 2 ml, the titration is to be repeated, starting from the extracted pigment, with the addition of 5 ml of potassium ferricyanide solution.

B-3 CALCULATION

B-3.1 Chromic anhydride (CrO_3),

$$\text{percent by mass} = \frac{3{\cdot}334 \times V_1 \times N}{M}$$

where

V_1 = volume in ml of sodium thiosulphate solution used in the first titration,

N = normality of sodium thiosulphate solution used, and

M = mass in g of the material taken for the titration.

B-3.2 Zinc oxide (ZnO),

$$\text{percent by mass} = \frac{12{\cdot}45 \times V_2 \times N}{M}$$

where

V_2 = volume in ml of sodium thiosulphate solution used in the second titration, and

N and M have the same legend as in **B-3.1.**

ANNEX C

(*Clause* 4.6)

TEST FOR RESISTANCE TO SEA WATER

C-1 APPARATUS

A small container capable of holding sufficient sea water for the immersion of 75 mm of the panel.

C-2 REAGENT

C-2.1 The natural sea water should be taken for not less than one foot below the surface by a method which does not contaminate from the surface layer. In areas where there is pronounced tidal action, the water should be taken near full flood and should, initially, have a salinity of not less than 30 and a *p*H of not less than 8.0.

C-2.2 If natural uncontaminated sea water is not available, a synthetic sea water to the following formulation may be used:

Sodium chloride	26.5 g
Magnesium chloride	2.4 g
Magnesium sulphate	3.3 g
Calcium chloride	1.1 g
Potassium chloride	0.73 g
Sodium bicarbonate	0.2 g
Sodium bromide	0.28 g
Water, distilled	1 000 ml

C-3 PROCEDURE

C-3.1 Prepare a panel of 150 mm × 50 mm × 1.25 mm mild steel plate as described in IS 101 (Part 1/Sec 3) : 1986. After seven days of application, immerse 75 mm of the panel in the reagent, for a period of seven days, at a constant temperature.

C-3.2 Reporting

At the end of the specified time of immersion remove the panel and immediately swab it vigorously with a cotton-wool swab soaked in the paint remover. Examine the paints for signs of removal.

ANNEX D

(*Clause* 4.9)

TEST FOR FIRE RETARDANCE

D-1 APPARATUS

D-1.1 It consists of an open fronted cabinet 460 mm × 300 mm × 320 mm (approx) constructed of fire-proof insulating board. Two runners, at top and bottom are provided to hold a 300 mm × 300 mm × 1.25 mm steel panel vertically, 150 mm from one end of the cabinet during the test. A provision is made to heat the centre of the panel by means of a gas ring burner, approximately 70 mm diameter positioned vertically in the larger compartment of the cabinet. The longitudinal distance of the burner from the centre of the panel is adjustable.

Gas and air supplies to the burner are controlled by means of valves and manometers. A non-return valve shall be fitted to the gas supply line.

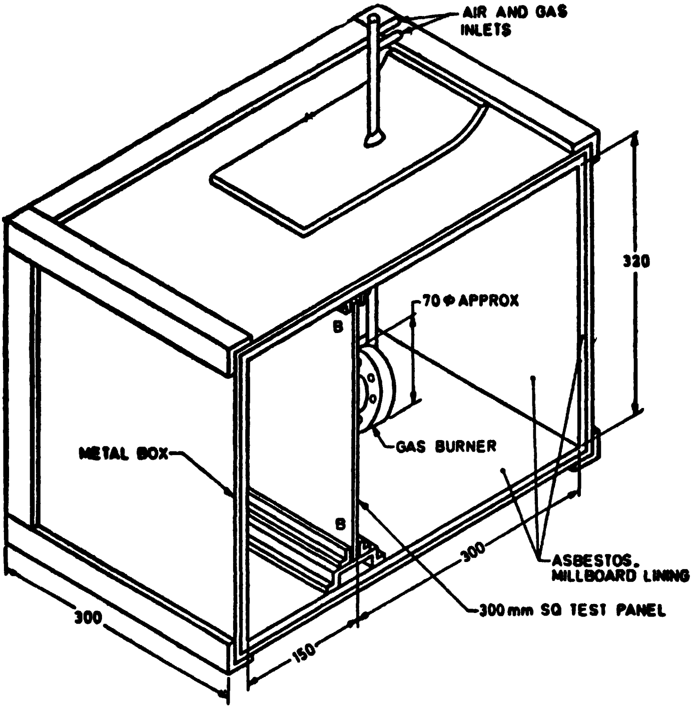
A diagram of a suitable apparatus is given in Fig. 1.

D-1.2 Test Panels

Prepare the panel as described in IS 101 (Part 1/Sec 3) : 1986.

D-2 PROCEDURE

D-2.1 Insert a 300 mm × 300 mm × 1.25 mm unpainted steel panel between the runners and shield it from the burner by means of a removable fire-proof sheet. Light the gas burner and adjust the gas and air flow to obtain the flame required to raise the impingement area to a dull heat in 25 ± 5 seconds from the time of removal of the protecting fire-proof sheet. When this has been obtained, record the manometer readings.



All dimensions in millimetres.

FIG. 1 FIRE RETARDNESS APPARATUS

NOTE — Experimentation with a number of unpainted panels using varying gas and air pressure will be required to obtain the correct rate of heating required.

D-2.2 Turn off the gas and air supply and replace the unpainted steel panel with the panel to be tested (*see* **D-1.2**) ensuring that the unpainted side of the panel is facing the burner and is shielded from it by means of the fire-proof sheet. Re-light the burner and adjust the gas and air pressures to those recorded in **D-2.1** Remove the fire-proof sheet and allow the flame to impinge on the test panel for 60 seconds.

D-3 OBSERVATIONS

D-3.1 Observe the behaviour of the paint film and test for evaluation of flammable gases by applying a lighted taper 10 seconds after commencement of the test. Examine the paint film after the 60 seconds burning time for signs of blistering, glowing of charred film and detachment from the substrate.

D-3.2 It shall not show more than slight blistering, evaluation of flammable gas, glowing of charred film or detachment from the substrate. In these respects, it shall not be inferior to a film prepared from the approved sample and tested in the same manner.

ANNEX E

[*Table* 1, *Sl No.* (xii)]

METHOD FOR ACCELERATED STORAGE STABILITY TEST

The paint sample is stored in a closed container and kept at 60°C for 96 hours. After the test paint shall not gel, liver, curdle or increase in efflux time by more than 20 percent, and there shall be no evidence of seeding. The paint shall meet the drying time requirement and shall produce dry film that is uniform in appearance and free from streaking, mottling and seediness. Further the change in gloss value from the original shall not be more than 5 units.

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